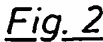


- (51)

are provided which extend about the circumference of the duct and when inflated force seal elements 40 into sealing contact when the valve is either open or closed.

(57) A spade valve having a housing 11 containing a duct 12 having an inlet 13



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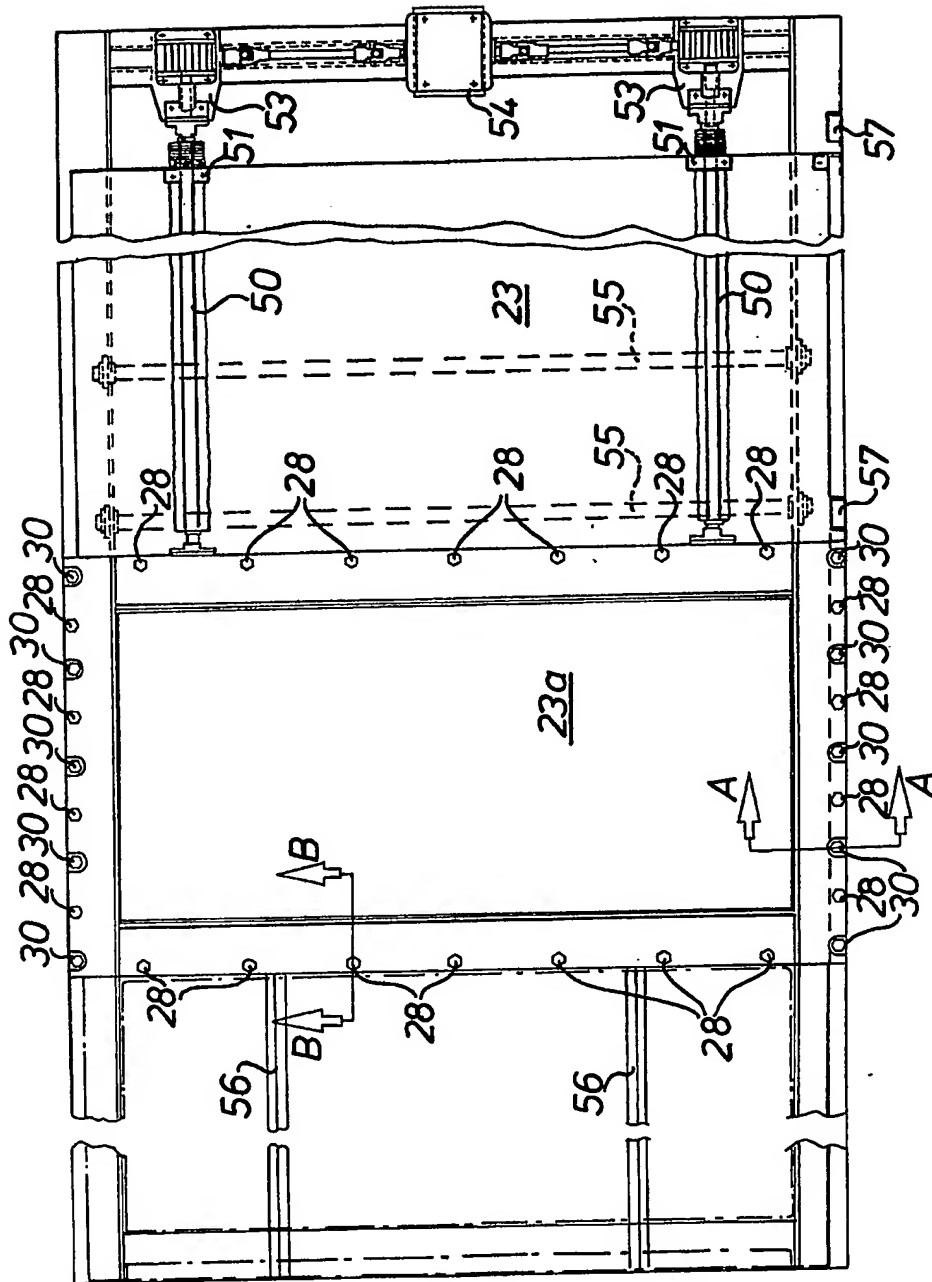
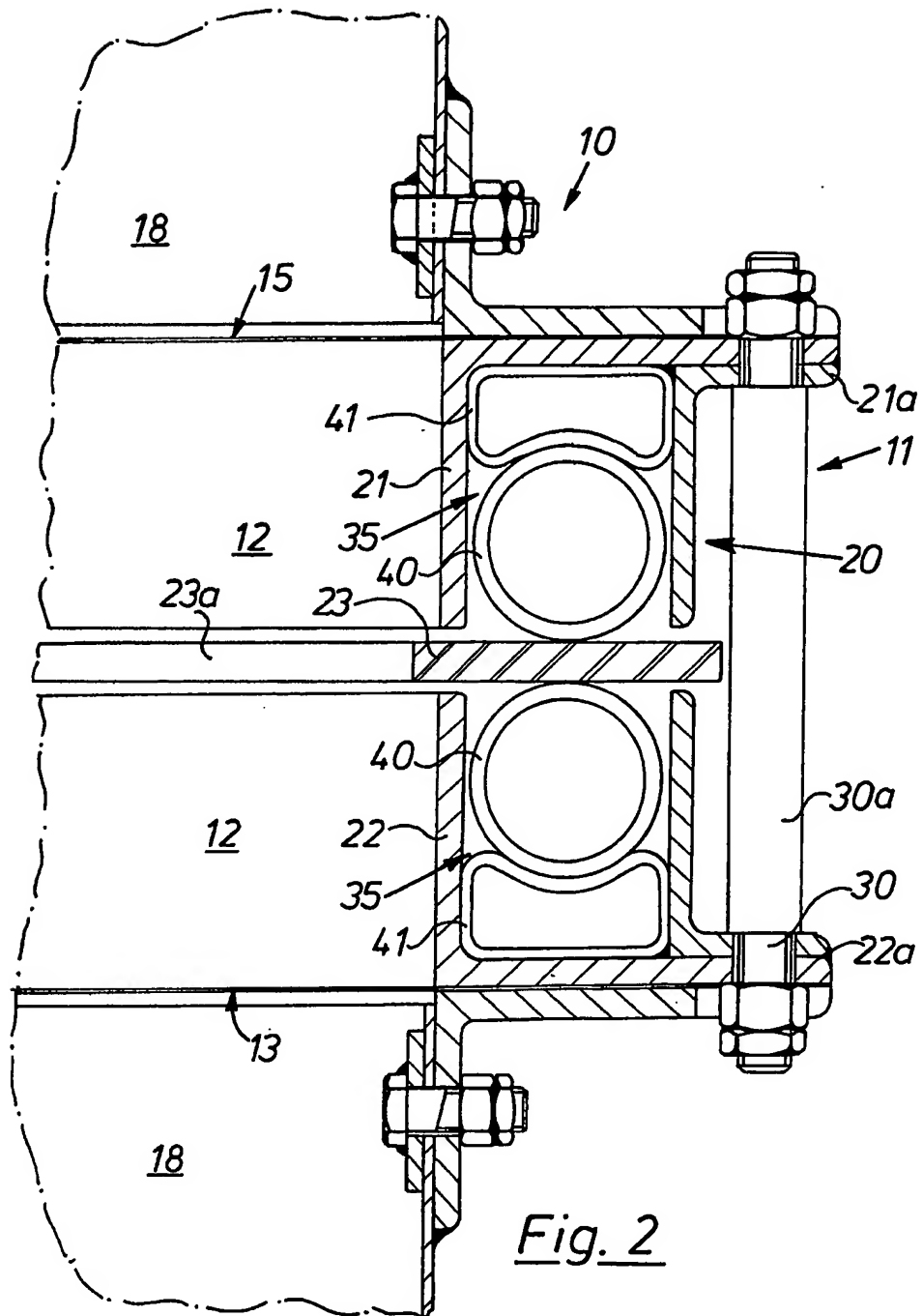
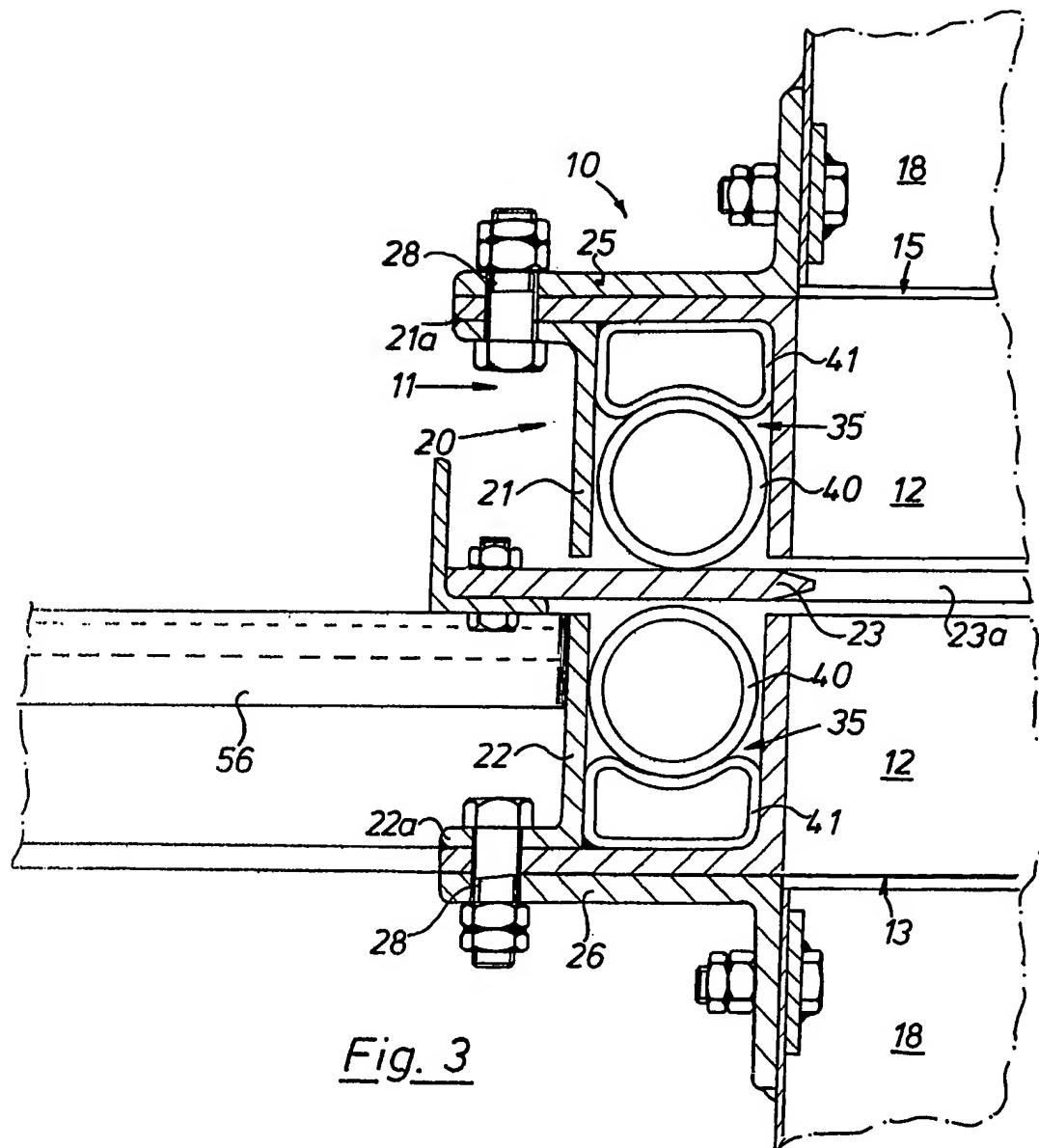


Fig. 1

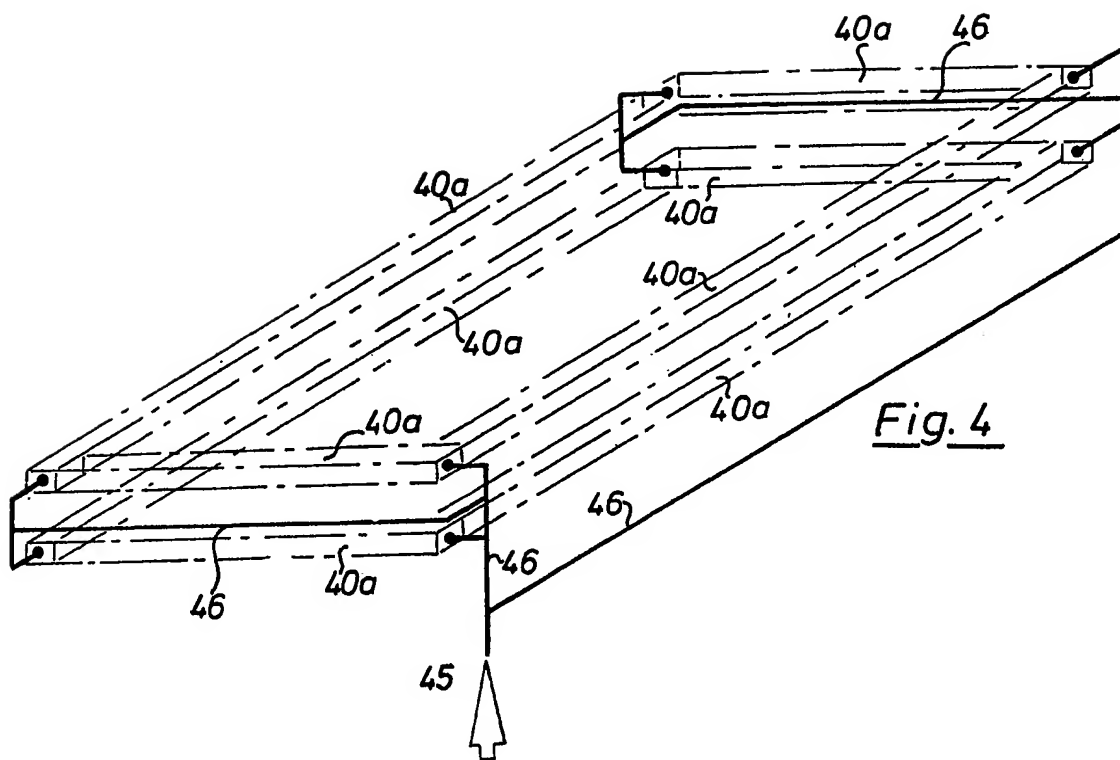
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Fig. 3

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## SPECIFICATION

## Spade valves

- 5 The present invention relates to space valves and in particular to a spade valve for use as an isolating damper.

According to one aspect of the present invention there is provided a spade valve having a housing containing a duct having an inlet and outlet and a spade valve element movably mounted in the housing for movement between an open position whereat it permits communication between the inlet and outlet and a closed position whereat it prevents communication between the inlet and outlet, fluid inflatable seal means being provided which extend about the circumference of the duct to provide a seal to prevent escape of fluid passing along the duct when the spade valve element is in a closed or open position.

Other aspects of the present invention are hereinafter described with reference to the accompanying drawings, in which:-

*Figure 1* is a plan view of a spade valve according to the present invention.

*Figure 2* is a sectional view taken along line A-A of *Figure 1*.

*Figure 3* is a sectional view taken along line B-B of *Figure 1*.

*Figure 4* is a schematic illustration of the pneumatic seal means.

Referring initially to *Figures 2* and *3*, the valve according to the present invention is generally shown at 10 and includes a housing 11 which includes a duct 12 which has an inlet 13 and outlet 15 each communicating with conduit 18.

The walls 20 of housing 11 are defined by opposed channels 21, 22 which are spaced apart by sufficient distance to enable a spade valve element 23 to pass therebetween. The opposed channels 21, 22 each have outwardly projecting flanges 21a, 22a respectively which are bolted to flanges 25, 26 respectively by bolts 28 in order to secure the housing to the conduit 18. The flanges 21a, 22a are also bolted together by bolts 30 which have increased diameter centre portions so as to space flanges 21a, 22a apart by the desired distance. In the illustrated embodiment, the increased diameter portion is formed by a sleeve 30a received on bolt 30.

Each channel 21, 22 houses pneumatic seal means 35 which comprises a seal element 40 which is spaced from the base of the channel by an inflatable tubular seal element 41. Advantageously seal elements 40 are a suitable plastics material such as a glass filled polytetrafluoroethylene plastics and seal elements 41 are conveniently formed of silicone rubber tubing. It will be appreciated that elements 40 may be solid in cross-section or hollow and that choice of materials for both elements 40 and 41 may be varied to accommodate for the working condition of the spade valve. The above choice of materials for elements 40, 41 is suitable to accommodate for a working temperature up to about 250°C.

When the spade valve element 23 is in a closed or open position, seal elements 41 are pressurised to a

predetermined level in order to cause inflation thereby forcing seal elements 40 into sealing abutment with the spade valve element 23. If the spade valve element 23 is not provided with an aperture so that it has to be fully removed from housing 11 to fully open valve 10, then opposing seal elements 40 are urged into sealing abutment in order to prevent escape of fluid travelling along conduit 18.

When the valve element 23 is being moved, pressure within seal elements 41 is reduced to a predetermined low level which enables seals 40 to maintain sealing engagement with spade valve element 23 during its movement.

As illustrated in *Figure 1*, the conduit 18 and valve housing 11 are rectangular in shape and accordingly it has been found convenient to form the element 40 for each channel 21, 22 in four separate lengths 40a as seen in *Figure 4*. Air is supplied to each length 40a from a common source 45 via branch lines 46.

The seal elements 41 are also formed in similar elongate strips and their ends are sealingly jointed together in any convenient manner, e.g. by a 45° mitre joint wherein abutting faces are sealed with a gasket of silicone rubber, the ends being secured together by a screw passing through one strip and being engaged by a crossbar formed in an adjacent strip.

It will be appreciated that if housing 11 were circular in shape, then conveniently each element 40 and 41 would be formed in one continuous length.

In *Figure 1*, the spade valve element 23 is arranged to be driven by two drive screw shafts 50 which are threadedly received in bosses 51 secured to the element 23.

One end of each shaft 50 is rotatably secured to housing 11 and the other end is arranged to be rotatably driven by a gear box 53. Each gear box 53 is rotated by a common drive source 54 which in the illustrated embodiment is an electric motor but which may be a manual drive source if desired.

The spade valve element 23 is supported on rollers 55 and support rods 56 during its movement toward and away from the housing 11. The valve element 23 illustrated in *Figure 1* is shown in its fully open position whereat the aperture 23a of valve element 23 is positioned within housing 11 so as to be co-axial with conduit 18.

Limit switches 57 are provided for controlling operation of the electric motor so as to indicate when the element 23 has reached its fully open or fully closed position.

Although seal element 41 has been described as being inflated by air it is envisaged that other fluids may be used, for instance a liquid such as water. Such a fluid may be used with advantage to provide a cooling effect.

## CLAIMS (Filed 13 Jan 1982)

1. A spade valve having a housing containing a duct having an inlet and outlet and a spade valve element movably mounted in the housing for movement between an open position whereat it permits communication between the inlet and outlet and a closed position whereat it prevents communication

between the inlet and outlet, fluid inflatable seal means being provided which extend about the circumference of the duct to provide a seal to prevent escape of fluid passing along the duct when

5 the spade valve element is in a closed or open position.

2. A spade valve according to Claim 1 wherein the housing includes a pair of channel members rigidly connected to one another and being spaced  
10 apart to define a passageway for said valve element, each channel member housing said seal means.

3. A spade valve according to Claim 2 wherein the seal means housed in each channel member comprises a seal element which extends continuous  
15 about said duct and inflatable seal means located between the channel member and seal element, the inflatable seal means on inflation urging the seal element toward the other channel member.

4. A spade valve according to Claim 3 wherein  
20 the seal means is arranged so that in the absence of the spade valve the seal elements can be moved into sealing contact with one another by said inflatable seal means.

5. A spade valve according to Claim 3 or 4  
25 wherein the duct is round in cross-section and each of said inflatable seal means is in the form of a single inflatable tube.

6. A spade valve according to any of Claims 1 to 4 wherein the duct is rectilinear in cross-section, the  
30 inflatable seal means for each channel member comprises a series of individual elongate inflatable tubes.

7. A spade valve according to Claim 5 or 6 wherein the inflatable seal means for both channel  
35 members are connected to a common source of pressurised fluid for inflation.

8. A spade valve substantially as described with reference to and as illustrated in the accompanying drawings.